

REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Objection to Drawings

Fig. 2 has been amended to indicate the legs 26 and top surface 22 of the frame 2, and to show springs 27. In addition, the depiction of the limit switch 31 has been modified to be consistent with the depiction in Fig. 4, which shows that the switch extends below the legs 26 (see, part 3c, below).

It is believed that all elements shown in Fig. 1 are now clearly shown in Fig. 2, and that the requirement for showing and labeling all elements illustrated in Fig. 1 has been met. Withdrawal of the objection is accordingly requested.

2. Objection to Specification

This objection has been addressed by adopting the suggestions made by the Examiner in items 2 and 3 of the Official Action.

3. Rejection of Claims 1-3 Under 35 USC §112, 1st Paragraph

This rejection is respectfully traversed because:

a. Flexible Plate

The opening in plate 33 functions as a washer. Because plate 33 is flexible, it engages and forms a seal with the trace sphere 24 in the same manner that any other washer like object or gasket forms a seal. While the engagement between plate 33 and the track ball will inherently involve some friction which will increase the effort need to rotate the ball, the plate can easily be made sufficiently slippery to enable turning of the ball by a user. Silicon rubber or Teflon seals that permit relative rotation of the object being sealed, sometime

known as “frictionless seals,” are common in the mechanical arts and the same material can easily be used as plate 33.

Furthermore, it is respectfully noted that U.S. Patent Nos. 5,214,415 (Pandolei, discussed below in connection with the rejection under 35 USC §103(a)) and 5,734,374 (Chambers, cited by the Examiner as background) respectively show similar sealing arrangements. In Pandolei, the ball 14 rotates with respect to seal 14 and in Chambers, the ball 214 moves in an opening of a seal 212. In each case, the edges of the seal engage the ball without substantially impeding rotation.

The sealing arrangements shown in the Pandolei and Chambers patents operates in the same manner as that of the claimed invention, except that the present invention uses a plate with an opening rather than an annular sealing ring. Accordingly, it is respectfully submitted that those skilled in the art could easily have implemented the sealing plate described in the original specification using well-known principles of frictionless or low friction seals, as evidenced by the disclosure of the Pandolei and Chambers patents.

b. Reflection Board

This rejection has been addressed by amending the specification to change the term “reflection board” to –optics board–, and by amending the claims to delete the recitation of the “reflection board.”

It is respectfully submitted that the use of a board 28 supporting optical elements is well-known, and in fact is necessary to detect movement of the ball in the case of an optical mouse. The optics might include, for example, a light source and detector for the reflected light. Because such “optics” boards are standard features of trackballs of the illustrated type, the change from “reflection

board” to “optics board” should not represent “new matter.” On the other hand, encoder or optics elements may be mounted directly on the circuit board, and therefore the recitation of the optics board has been deleted from the claims.

c. Limit Switch

This portion of the rejection has been addressed by amending Fig. 2 to extend the limit switch 31 to below the bottom of legs 26, so that when legs 26 move downward, they do not interfere with engagement of the limit switch and the “under board” 15.

This revision to the drawings is consistent with the description of the operation of the switch (when frame 2 moves downwards, the limit switch also moves downward to engage the board, which it could not do if it did not extend below legs 26), and also with the depiction of the limit switch in Fig. 4 as originally filed. It therefore does not involve “new matter.”

Since each of the elements noted by the Examiner are either disclosed in the original specification or would have been familiar and easily implemented by the skilled artisan, as evidenced by the prior art cited by the Examiner, withdrawal of the rejection of claims 1-5 under 35 USC §112, 1st Paragraph is respectfully requested.

4. Rejection of Claims 1-5 Under 35 USC §103(a) in view of U.S. Patent Nos. 5,565,891 (Armstrong) and 5,214,415 (Pandolei)

This rejection is respectfully traversed on the grounds that the Armstrong and Pandolei patents fail to disclose or suggest, whether considered individually or in any reasonable combination, a mouse assembly in which, in combination:

- sealing is provided by a flexible water-proof plate mounted to the top of a protrusion of a frame (claim 1);

- a limit switch is connected to a circuit board attached to the underside of the frame (claim 1);
- the frame supports a trace ball and includes legs and spring supports (claim 6); and
- the frame is movable in the base to cause the limit switch to engage an under board attached to the base (claim 1).

The Armstrong patent does not disclose any sort of flexible seal as recited in claim 1, and also fails to disclose or suggest the claimed frame legs and springs as recited in claim 6. While the Armstrong patent does disclose a limit switch 110 similar to that of the claimed invention, the circuit board of Armstrong rests directly on flexible foam cushions 30, rather than being supported by a frame movable in a base and having legs and spring supports in the manner recited in claim 6. As a result, the structure of Armstrong appears to be less compact than that of the claimed invention, and likely less reliable due to the use of foam rather than springs.

These deficiencies are not remedied by any teachings in the Pandolei patent. While the Pandolei patent discloses a seal 31 that engages a sphere 14, the seal 31 disclosed in the Pandolei patent is not in the form of a flexible *plate* mounted to the *top* of the sphere-supporting protrusion of a movable frame, as recited in claim 1, and therefore does not correspond to the claimed flexible plate.

Furthermore, the Pandolei patent could not have suggested modification of the limit switch structure activating structure of Armstrong to include the claimed legs and springs of claim 6 since the Pandolei patent does not disclose any sort of limit switch.

The claimed invention's combination of frame, protrusion, base, sealing plate, and switch that is believed to result in a more compact and reliable structure than those shown in the references, without any loss of functionality. Since this combination is not suggested by the

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references applied by the Examiner, withdrawal of the rejection of claims 1-5 under 35 USC §103(a) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

BACON & THOMAS, PLLC

A handwritten signature in black ink, appearing to read 'B. Urcia', with a long horizontal line extending to the right.

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